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THE VETERINARY JOURNAL

A Monthly Review of Veterinary Science.

Editors:

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PROFESSOR OF VETERINARY MEDICINE, PARASITOLOGY AND HYGIENE, IN THE ROYAL VETERINARY COLLEGE, LONDON.

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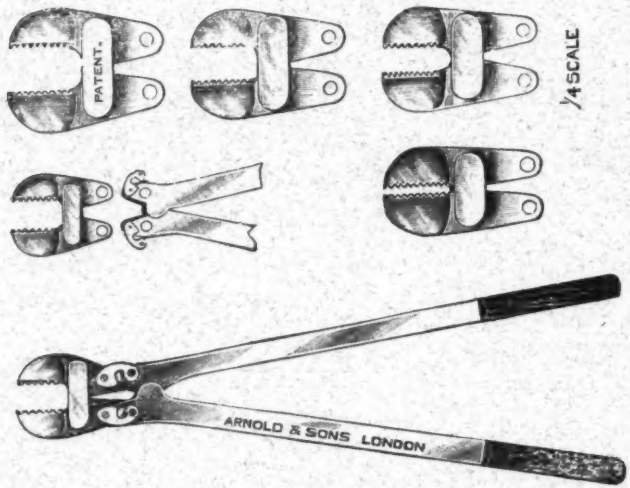

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CONTENTS.

	PAGE
MR. JOSEPH H. CARTER, F.R.C.V.S., F.R.S.E.	349
EDITORIALS—	
The Public Abattoir Question	350
"Gilbert and Sullivan" Amongst the Veterinary Inspectors	351
GENERAL ARTICLES—	
The Castration of Ostriches. By STANLEY ELLEY, M.R.C.V.S.	352
Points in the Anatomy of the Fore Limb of the Llama as compared with Capra and Equus. By J. SHARE-JONES, M.Sc., F.R.C.V.S.	361
Local Anæsthesia. By Vet. Councillor VAETH	373
CLINICAL ARTICLES—	
Notes on an Outbreak of Horse Sickness, Connected with the Presence of a Lyperosia as a possible Transmitter. By Capt. A. J. WILLIAMS, F.R.C.V.S.	382
Five Cases of Muscular Rheumatism	387
CANINE CLINICAL—	
Somewhat Unusual Effect of Morphia in Two Pugs. By S. J. MOTTON, M.R.C.V.S.	388
ABSTRACTS AND REPORTS	389
THE LATE MR. R. A. N. POWYS	390
ROYAL COLLEGE OF VETERINARY SURGEONS	391
REVIEW	394
TRANSLATION	395

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The newly elected President of the Royal College of Veterinary Surgeons.

THE

VETERINARY JOURNAL

AUGUST, 1913.

MR. JOSEPH H. CARTER, F.R.C.V.S., F.R.S.E.

THE unanimous election of Mr. Joseph Carter to the position of President of the Council of the Royal College of Veterinary Surgeons will have given universal satisfaction to the profession, especially the provincial practitioners, amongst whom Mr. Carter is deservedly popular.

A Lancashire man and a successful practitioner, Mr. Carter has for many years held positions of prominence in his native town. In Burnley he is a Town Councillor of well deserved popularity, whose word on matters pertaining to the welfare of the town, particularly the hygienic aspect, is much in request, and his position has been incontestably assured for a period of twelve years, as with one exception his election has never been opposed. His popularity amongst his fellow Councillors has been demonstrated by his election to the chairmanship or vice-chairmanship of numerous committees, and amongst his colleagues on the Royal College Council his geniality and soundness in opinions, when expressed, are too well known to need comment. It is his sixteenth consecutive year of service as a Member of Council, and this in itself is proof enough of his popularity amongst the rank and file of the profession. Brought up in the profession (his father was in practice at Bradford), Mr. Carter graduated at the New College in Edinburgh in 1882, and obtained his Fellowship in July, 1887.

In 1905 he was elected as a Fellow of the Royal Society of Edinburgh, and on two occasions has been President of the Lancashire Veterinary Medical Association. In Freemasonry he has held some of the highest offices, and with the reputation which he holds as an honourable and keen business man the veterinary profession may rest content that the hand which guides the helm of veterinary progress during the next twelve months is one to which it can be thoroughly trusted to bring the ship safely through the troublous period into which it appears still to be embarked.

Editorials.

THE PUBLIC ABATTOIR QUESTION.

At a recent meeting of the Council of Justice to Animals, a society formed to promote the humane slaughtering of animals used for food, one of the speakers, Lord Ernest Hamilton, brought forward a scheme for the erection of a model abattoir near London, in which it would be necessary for every butcher who used it for slaughtering cattle and other animals to use only one or other of the humane killers.

The subject is of interest to us because the time is certainly coming when England must fall into line with the Continental nations, and have decent abattoirs and a rational system of meat inspection controlled by properly qualified men. Almost every town on the Continent has this, and it is to our interest as a profession to support all schemes of this kind; in fact, we ought to figure prominently amongst the promoters and not stay away in the background.

The fact which strikes one the most is that private enterprise should be necessary to start such a scheme, when Government should really enforce it.

Lord Ernest Hamilton's scheme includes a model abattoir where butchers who use it can afterwards advertise the fact that all meat sold in their shops is from animals which have been killed painlessly, and thus educate the general public to refuse to deal at shops where antiquated and ineffective methods are still employed.

The Council of Justice, too, are taking up the question of licensed slaughtermen, and if only a law can be passed to make the possession of a licence necessary, a licence which will indicate proficiency in dispatching beasts expertly, fully one-half the unintentional pain inflicted in slaughter-houses at the present day will be done away with.

In all these questions we, as veterinary surgeons, are interested and should, indeed, take a leading part; for no body of men are so well qualified by their special training to pass their opinions upon matters of this kind as are the members of our profession.

"GILBERT AND SULLIVAN" AMONGST THE VETERINARY INSPECTORS.

Our power, or our powerlessness, are about to be demonstrated, for the appointment of an unregistered and unqualified man as "Chief Veterinary Inspector to the Local Government Board for Scotland" is about to be questioned. To appoint a man who is not a veterinary surgeon as "Veterinary Inspector," if not an offence against the law, should be made so just as much as if the man himself put upon his plate, or in his description of his qualification, anything which attempted to foist upon the public the idea that he was qualified in the science and art of the treatment of animal diseases; and anyone qualified as a doctor in human medicine who accepts such a title and position is acting in a manner derogatory to the tenets of a professional man.

The Council of the Royal College have the matter in hand, and they will signally fail in their duty if they do not bring the matter to the only possible conclusion, which is that no man shall hold the post of "Veterinary Inspector" unless he has previously become by examination a duly qualified veterinary surgeon. If a private individual started in practice and put upon his plate the words "Veterinary Inspector," he would at once be prosecuted and compelled to remove the description; much more should an official who holds an important appointment, which he is not qualified for, be compelled to alter his title or resign his billet.

The idea of a doctor of human medicine inspecting cattle, either alive or dead, and giving his opinion as one superior to the rank and file veterinary inspector is too absurd to need comment, and it would be laughable had it not become an accomplished fact, and thus too serious to allow to pass without dispute.

What would be said if a veterinary surgeon was appointed as "Chief Medical Inspector" to some asylum or to some County Council, and the inspectors of the rank and file were ordered to report their cases to him? We venture to say that there would be a rebellion at once, and we on our part must refuse at once to act. It is our duty, the duty of the whole profession, to refuse to "cover" an unqualified man; and the Council, whose protest

was so strong at the last quarterly meeting, look to the members of the profession who are veterinary inspectors in Scotland to strengthen their hands by refusing, one and all, to act in concert with (in other words, to "cover") an unqualified man.

We are sorry to write so strongly upon the subject, but we are very much surprised that a medical man, whose ideas of professional etiquette should be so well grounded, should consent to usurp or assume any position for which he knows he has no right and no qualification, and we sincerely hope that before the next issue of this Journal appears this "Gilbertian" situation will have been rectified.

General Articles.

THE CASTRATION OF OSTRICHES.

By STANLEY ELLEY, M.R.C.V.S.
Government Veterinary Surgeon, Oudtshoorn, Transvaal.

The castration of ostriches was first undertaken and advocated by the writer in 1906. The objects which it was sought to obtain by the operation were as follows:—

(1) To check the indiscriminate breeding of inferior birds, which was at that time being largely practised, particularly in the Midland and North-Western Districts of the Cape Province, then the Cape Colony.

(2) To enhance the value of the feathers: (*a*) By the production of cleaner and less damaged feathers; (*b*) by increased weight.

(3) To tame vicious birds.

(4) To produce good foster-parents, which, whilst looking well after the chicks, would not become savage when fed along with the chicks on grain.

Moreover, it seemed most probable that if it proved possible to castrate birds with but a slight percentage of deaths from the operation the practice was bound to become general, since with no other class of stock would all the entire animals produced be allowed to remain as such.

It may now, after only seven years, be claimed that the anticipations then expressed have in every instance, though in varying degree, been realized. Indiscriminate breeding is

rapidly decreasing, and although this is by no means due entirely to castration, there is no doubt that the practice gave a stimulus to the breeding and classing of the superior birds, particularly in the districts above referred to.

That the feathers of capons are cleaner and less damaged than in the entire birds no one will dispute; while some farmers who kept careful records state that the weight of the white feathers alone increased as much as an ounce per bird per plucking after castration.

FIG. 1.—Spayed Hen. Note black feathers. Hen six months after castration. Observe the drab feathers, both on the upper part of wing and chest, commencing to turn black.

That all vice has been permanently removed from even the most savage and dangerous birds when castrated is well known practically on every farm where the operation has been performed, these having generally been the first birds selected for the operation. Again, those farmers who use capons as foster-parents would almost as soon lose one of their valuable breeding birds as one of their "Kuiken-Wachters."

The fact that seven years ago the operation was practically unknown, whilst to-day there are several men throughout the province who make a living by this one operation alone, is sufficient indication that the practice is becoming popular. Not only, as has been stated, has the weight of the feathers been increased, but no corresponding falling off in gloss or lustre,

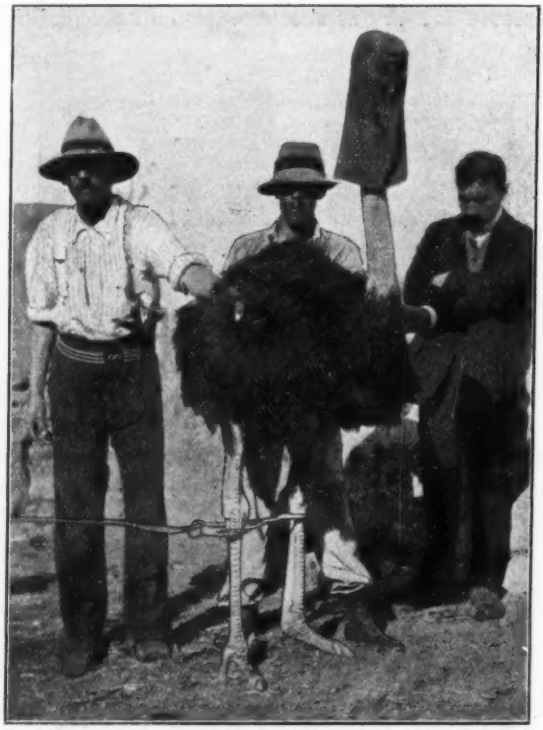

FIG. 2.—Bird ready to be cast. Showing how the attachment is placed round legs. Ordinary plucking cap on head.

as was predicted by those opposed to the operation, has been testified to by the largest feather buyers in Africa.

The extraordinary phenomena of the feathers of the castrated hens assuming the characteristics of the male birds' feathers has

enhanced the value of such feathers even more than was contemplated.

The Operation.

The bird having been starved for from twelve to twenty hours is cast in the following manner: An ordinary plucking cap is placed on the head, and a "riem" (a long rawhide strap with a ring attached to one end) or a soft rope is quickly placed round the legs in the figure of eight fashion, commencing with the left leg, the side on which the bird must fall; one man takes hold of

Fig. 3.—Ostrich castration. Bird cast and receiving the anæsthetic.

the left wing and a second of the tail, whilst the third takes the free end of the riem and pulls steadily, standing at a right angle to the bird's right wing. As the legs are pulled from under the bird those holding the wing and tail allow the bird to come steadily to the ground on its left side, which position is maintained throughout the operation. The plucking cap is now removed and the chloroform inhaler takes its place. A drachm to two drachms of pure chloroform are placed within the inhaler, this dose being repeated every two minutes until complete anæsthesia

is produced. This usually occupies six to eight minutes, depending to some extent upon the size and condition of the bird and the weather, strong winds causing an excess of air to enter the inhaler. The eyes being covered by the inhaler the conjunctival reflex cannot be taken. A simple method to ascertain if the patient is completely under the influence of the anæsthetic is to take hold of the right leg, lying uppermost, and attempt to pull the bird on to his back. This will invariably be resisted, even when a sharp slap fails to bring any response. The legs can now be entirely loosened, or otherwise each one must be held in a

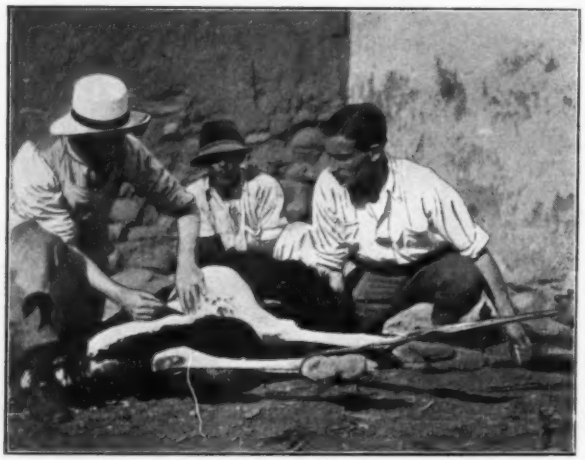

FIG. 4.—The site of the operation. Note position of legs.

separate riem, so that the right one may be taken forward as far as possible, which arrangement exposes the seat of the operation.

At the junction of the skin of the leg with that of the body a small pouch or cul-de-sac will be seen in the loose skin; this pouch is the spot from which the incision commences. Having well disinfected this area, an incision about 4 in. long is made through the skin, cutting backwards and very slightly downwards. The amount of subcutaneous tissue encountered between the skin and peritoneum will depend upon whether the birds have been grazing upon the veld or upon lucerne lands. In the former case only a very slight layer of the abdominal muscles, less than a

quarter of an inch in thickness, will separate the skin from the peritoneum, whereas in the lucerne-fed bird it is not uncommon to find an inch or more of adipose tissue covering the peritoneum. Having reached this membrane care must be taken not to injure the underlying gut when opening into the peritoneal cavity. Either the peritoneum may be grasped in the forceps and raised from the underlying structures, or otherwise a very slight opening may be made with the knife and the point of the finger inserted, when it may be readily raised and the opening enlarged to admit the hand, which is now lubricated and forced gently inwards in an upward and slightly forward direction, when the testicles will be located immediately between the hip-joints attached firmly along the dorsal surface on either side of the spinal column, a fold of mesentery separating them from each other.

In a bird which has not yet reached the breeding stage, that is, under about eighteen months, the testes are encountered as two firm elongated structures about the thickness of an ordinary lead pencil and about 1½ in. long. It is at this age that it is advisable to operate. After a bird has reached maturity and has once paired, it is impossible to say in what condition the testes may be found; for, unlike any other animal or bird with which the writer is acquainted, the reproductive organs, and more particularly the testicles of the ostrich, enlarge during the breeding season, or whenever food is abundant, to an almost incredible size, again rapidly diminishing under adverse conditions. The largest testicles removed from an old breeding bird by the writer measured 7 in. long by 3 in. in diameter, weighing together 2 lb. 2 oz. Any condition between this and that described in the immature bird may be met with. The firm, characteristic feel of the testicles is, however, unmistakable, nor are there any other organs in this vicinity with which they could be confounded, the kidneys being large, flattened, hand-shaped structures, deeply embedded in the lumbar region. Having located them, the left or lower one should first be removed. An opening is made through the mesentery and the testicle grasped in the hand; it will be found to be attached along its dorsal surface, and this attachment is broken down with the point of the fingers, beginning at the posterior extremity. The tissues, except in an old bird, will be found to break away readily until the anterior extremity is almost reached. At this point the various vessels

enter and leave the organ, which should now be twisted until the connection is severed. The right or upper gland is then similarly removed. In cases where the testes are not developed to any great size, the one first removed may easily be retained in the palm of the hand whilst the second is removed, thus necessitating but one entrance and withdrawal of the hand from the peritoneal cavity. On the other hand, where the testes are very much enlarged considerable difficulty may be experienced in removing them from the abdominal cavity. In these cases the operator

FIG. 5.—The operation completed.

brings the detached organ to the opening with the right hand, and passes a curved suture needle threaded with quarter of an inch tape through it with the left hand; it is then allowed to fall back into the abdominal cavity, the hand is withdrawn, and the testicle removed by means of the tape. In cases where the testes are enlarged and vascular and considerable hæmorrhage has taken place, the abdominal cavity should be swabbed out with a few pieces of boracic lint or cotton-wool before suturing the incision. It then only remains to suture the peritoneum with five or six

gut sutures, depending upon the size of the incision made and the skin and muscle layer taken together with the same number of eighth of an inch tape sutures, and the operation is complete.

THE FEMALE.

The hen is cast in a similar manner to the male bird, the site of the operation being identical. It will, of course, be remembered that only the [redacted] ovary is developed in birds. It is found in precisely the corresponding position on the right-hand side as the left testicle of the male, and it is, therefore, necessary to break through the fold of the omentum before it can be removed. The position and attach-

FIG. 6.—After the operation. The inhaler removed and the bird placed in its natural position.

ment of the stomach preclude the possibility of operating from the left side, which otherwise would be the most convenient in the hen bird. In the female it is only young birds of less than two years of age which should be operated upon. In those that have reached the breeding stage, the ovary and many of the eggs contained therein have attained such a stage of development that ovariotomy is impracticable. In hens under the age stated the ovary to the touch gives one the impression of a small bunch of small grapes, and consists of hundreds of unfertilized eggs varying in size from a pin-point to a small marble, all developing

from a common membrane. This membrane is attached precisely as the left testicle and is removed similarly, the forefinger being inserted under its most posterior extremity and gradually worked forward, when it will be found to readily strip away. Care must, however, be taken to remove it in its entirety, otherwise some degree of egg development may recommence. Having removed the ovary, the remainder of the operation is as in the male.

Before removing the chloroform inhaler the patient must be placed in the position natural to birds when lying, that is, on the chest, with the legs pulled out well on either side to prevent it falling on its side. The bird should then be left without anyone, and if possible without other birds in sight, in which case when it wakes up it will probably remain lying quietly until the effects of the chloroform have passed off, when it will get up of its own accord. Should there be other birds close to the place, or should it be frightened upon waking up, in attempting to rise hurriedly it may fall heavily, tearing out the stitches and causing rupture through the incision. This point should always be borne in mind and insisted upon, as, with the exception of a few deaths from careless administration of chloroform on an occasion when five hundred birds had to be operated upon in a limited time, the only fatalities encountered have occurred when the birds were too hastily caused to rise while still semi-conscious, and, after floundering about, fell and caused rupture.

The after-treatment consists merely in keeping the birds short of food for the first few days, after which the regular grazing may be allowed. There is no need to remove any of the stitches. The internal ones are quickly absorbed, and the outer tape sutures will be attended to by the bird himself, although I have occasionally found them in position as long as twelve months after the operation, apparently causing no irritation.

It may have been observed that no great stress has been laid upon asepsis, which is customary when treating upon intra-peritoneal operations. This is not due to an oversight; for, although strict cleanliness is always practised, the fact is, that such a thing as peritonitis or septicæmia in any form is unknown in the ostrich. This is no doubt accounted for by the different composition of the blood to that of mammalians. In close upon two thousand castrations, many of which have been in the nature of demonstrations where large numbers of farmers have placed

their hand within the peritoneal cavity to locate the testicles, no single case of peritonitis or other septic conditions have been known to result, and owners have now come to look upon the bird as safe when once he has risen to his feet after the operation.

POINTS IN THE ANATOMY OF THE FORE LIMB OF THE LLAMA AS COMPARED WITH CAPRA AND EQUUS.

By J. SHARE-JONES, M.Sc., F.R.C.V.S.,
University of Liverpool, School of Zoology.

(*Continued from p.* 321.)

Inner Aspect.

Bones.—No part of the ventral surface of the scapula is uncovered by muscle.

A more remarkable and unusual fact, however, is that the inner surface of the shaft of humerus is entirely clothed by muscle. This is due to the large size of the caput parvum, the muscular portion of which extends right down to the olecranon process; and also to the size of the coraco-humeralis.

The internal condyle of the humerus may be detected, as also the olecranon process, which is somewhat prominent.

Almost the whole of the inner surface of the shaft of the radius is unclothed (fig. iv, 9), the upper extremity only being concealed by a portion of the deep flexor muscle of the digit (fig. iv, 8).

The bones of the carpus are particularly well clothed and protected to a remarkable degree. The inner surface of the metacarpal bone, on the other hand (fig. iv, 15), is subcutaneous throughout its extent, but the bones of the digit are concealed.

Muscles and Tendons.

Subscapularis (fig. iii, 14).—Broad and covers the ventral aspect of the scapula.

Supraspinatus (fig. iii, 13).—A thin strip of this muscle extends beyond the coracoid edge of the scapula.

Teres Major (fig. iii, 17).—Relatively large and extends along the whole length of the glenoid border of the scapula.

Caput Magnum (fig. iii, 19).—Broad and somewhat triangular in outline.

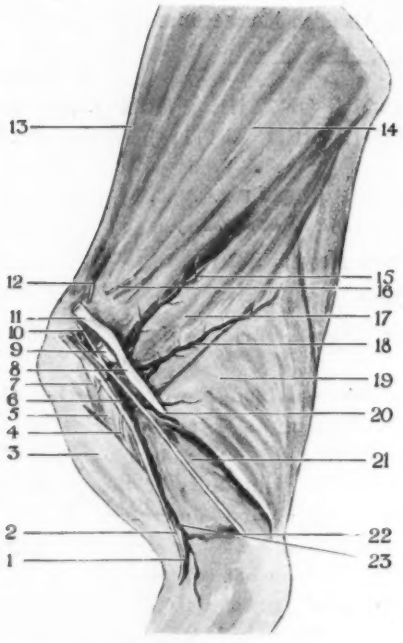

FIG. III.

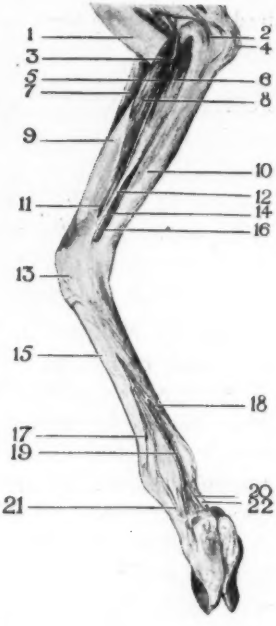

FIG. IV.

RIGHT FORE LIMB. INNER ASPECT.

1, Posterior radial artery; 2, median nerve; 3, biceps muscle; 4, nerve to coraco-humeralis; 5, coraco-humeralis muscle; 6, brachial artery; 7, nerve to biceps muscle; 8 and 11, musculo-spiral nerve; 9, circumflex nerve; 10, ulnar nerve; 12, supra-scapular nerve; 13, supraspinatus muscle; 14, subscapularis muscle; 15, long branch of subscapular artery; 16, subscapular nerve; 17, teres major muscle; 18, artery to latissimus dorsi; 19, large head of triceps extensor cubiti muscle; 20, deep humeral artery; 21, small head of triceps extensor cubiti; 22, ulnar artery; 23, musculo-cutaneous branch of median nerve.

RIGHT FORE LIMB. INNER ASPECT (*continued*).

1, Biceps muscle; 2, ulnar nerve; 3, median nerve; 4, summit of olecranon process of ulna; 5, posterior radial artery; 6, flexor metacarpi internus muscle; 7, extensor metacarpi magnus muscle; 8, portion of deep flexor of the digits (flexor perforans); 9, radius; 10, flexor metacarpi medius; 11, small metacarpal artery; 12, tendon of flexor metacarpi internus; 13, fibrous covering of knee; 14, large metacarpal artery; 15, metacarpal bone; 16, median nerve; 17, collateral digital nerve; 18, branch of communication to external plantar nerve; 19, common digital nerve forming collateral nerves of digits; 20, internal digital artery of external digit; 21, internal digital nerve of internal digit; 22, one of divisions of tendon of flexor perforans muscle.

Caput Parvum (fig. iii, 21).—This muscle calls for special remark. It is extremely large and its origin extends throughout the whole length of the inferior two-thirds of the inner surface of the shaft of the humerus. It is a bulky muscle, and between its supero-anterior border and the posterior border of the coraco-humeralis there is formed a channel down which the median nerve with its accompanying vessels runs. The muscular portion extends to the inner condyle of the humerus and its tendon is thus extremely short.

Coraco-humeralis (fig. iii, 5).—This is also a bulky muscle and it curves round more to the inner surface of the shaft of the humerus than in Equus. It is related, as stated, to the small head of the triceps extensor cubiti.

Biceps (figs. iii, 3, and iv).—This is relatively a very long and extremely powerful muscle. Its muscular belly extends throughout the whole length of the diaphysis of the humerus and its tendons are short and thick. It is related supero-posteriorly to the coraco-humeralis and inferiorly to the *caput parvum*.

It will thus be seen from what has been stated regarding the biceps and triceps extensor cubiti muscles, that the animal is capable of very powerful flexion and extension of the elbow-joint.

Extensor Metacarpi Magnus.—The inner portion of the belly of the muscle is represented on this aspect of the limb (fig. iv, 7). It has been fully described on the outer aspect.

Flexor Metacarpi Internus (fig. iv, 6).—This is made up of an extremely well-defined muscular strip somewhat delicate and strap-like in appearance. It has the usual origin from the internal condyle of the humerus. Its inferior tendon commences in the middle third of the forearm, so that it is relatively very long. It passes between the large and small metacarpal arteries, and running through a thecal canal on the inner side of the knee deeply seated passes to its insertion into the metacarpal bone.

The belly of this muscle is *not* related to the back of the radius, but rests through on the muscular portion of the deep flexor of the digit.

Flexor Metacarpi Medius (fig. iv, 10).—Relatively a much more powerful muscle than in most other animals. Its ulnar and humeral heads have strong tendons of origin which after a

length of only about an inch become united. The fibres then pass down the back of the common muscular portion and become continuous with the inferior tendon. This latter, though short, is very thick. It passes to the usual insertion.

It would thus appear that flexion of the carpus is effected chiefly by this muscle and that the other flexors, whilst certainly rendering it some assistance, rather tend to contribute to the elasticity of the movements of the joint.

Deep Flexor of the Digits or Flexor Perforans (fig. iv, 8).—In connection with this muscle there are one or two important points to be noted. It has a very much more extensive origin from the back of the radius than in most other animals. The inner portion of its belly extends to the proximal epiphysis of the radius and is visible on this aspect of the limb where it is represented in fig. iv. Moreover, this portion presents a groove on its posterior surface for the accommodation of the median nerve and its accompanying vessels, the posterior radial artery and vein. The muscle is here insinuated between the flexor metacarpi internus and the surface of the bone.

Its tendon passes through the carpal sheath and is not visible again until just above the metacarpo-phalangeal joints, since it is concealed by the fibrous tube extending down the metacarpal region from the knee and which has already been described. Splitting above this joint into two portions these pass one to each digit through the corresponding ring formed by the tendon of the superficial flexor. Emerging from these rings below the joint the divisions of the tendon are again observed as they pass to their insertion into the terminal phalanges.

Superficial Flexor of the Digits or Flexor Perforatus.—The tendon of this muscle also passes through the carpal sheath. It is not again visible until near the metacarpo-phalangeal joints, where it splits into two portions, one for each digit. These help to form the two rings referred to for the passage of the divisions of the tendon of the deep flexor.

The Arteries.

The *axillary* artery rests in a loop formed by the ulnar nerve (fig. iii, 10) and a branch from the median. Its subscapular branch gives off a voluminous branch which passes up the glenoid border of the scapula between the teres major and subscapularis muscles (fig. iii, 15).

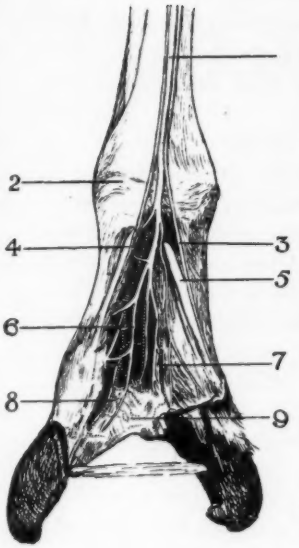

FIG. V.

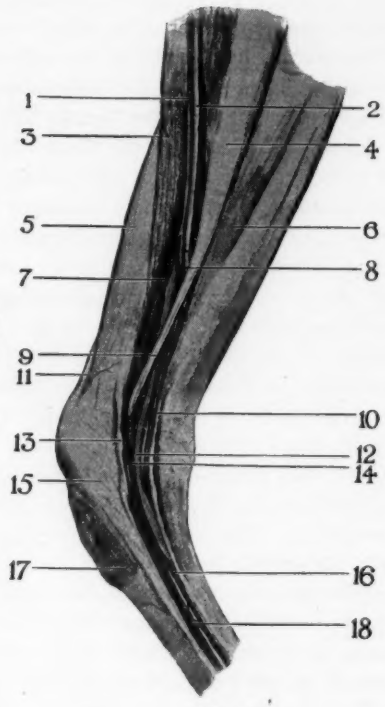

FIG. VI.

FOOT OF LEFT FORE LIMB WITH DIGITS SEPARATED. ANTERIOR ASPECT.

1, Superficial anterior metacarpal vein; 2, fibrous covering of fetlock (metacarpo-phalangeal joint); 3, dorsal nerve of external digit (derived from ulnar nerve); 4, external digital artery of internal digit; 5, outer division of tendon of anterior extensor of digits (extensor pedis); 6, interdigital plexus of veins; 7, internal digital artery of external digit; 8, branches of "4" running to form interdigital plexus of arteries 9.

RIGHT KNEE. INNER ASPECT (DEEP DISSECTION).

1, Posterior radial artery; 2, median nerve; 3, portion of deep flexor muscle of digits (flexor perforans); 4, flexor metacarpi internus; 5, radius; 6, flexor metacarpi medius; 7, small metacarpal artery; 8, large metacarpal artery; 9, tendon of flexor metacarpi internus; 10, deep fibrous arch at carpus (incised edge); 11, superficial branch of small metacarpal artery; 12, accessory tendon of flexor perforans; 13, superficial fibrous arch at carpus (incised edge hooked forward); 14, small metacarpal artery passing beneath "13"; 15, fibrous covering of knee; 16, large metacarpal artery emerging from beneath accessory tendon of flexor perforans; 17, branch corresponding to internal dorsal interosseous artery; 18, anastomosis of small with large metacarpal artery.

The artery to the latissimus dorsi (fig. iii, 18) is also a very large vessel. Its arrangement and distribution, however, are very simple, and it is interesting to compare it with the very much contorted and branched vessel in Capra. Giving off a few collateral branches in the llama it passes directly across the teres major and caput magnum to the latissimus dorsi.

The Brachial Artery (fig. iii, 6).—As in other animals, this is the direct continuation of the axillary.

It does *not* lie on the surface of the humerus. As usual, it crosses the direction of the shaft of the bone obliquely, but it lies at first in a groove formed between the coraco-humeralis and the small head of the triceps extensor cubiti after leaving the common tendon of insertion of the teres major and latissimus dorsi. It then passes downwards between the caput parvum and the biceps, and divides into anterior and posterior radial arteries. It gives off a very small prehumeral branch, which passes outwards through the coraco-humeralis. A very *large deep humeral branch* was detached at the lower border of the tendon of the teres major (fig. iii, 20), which passed downwards and backwards beneath the ulnar nerve to disappear in front of the large head of the triceps extensor cubiti.

The *ulnar* artery (fig. iii, 22) was detached from the brachial just above the elbow-joint. It passed downwards and backwards along the inferior border of the caput parvum to the inner surface of the olecranon process.

The simplicity of the arrangement of this vessel and also of the artery to the latissimus dorsi is accounted for by the presence of a large, deep humeral artery.

The anterior radial artery passes outwards beneath the biceps and is not seen on this aspect.

Posterior Radial Artery (fig. iv, 5).—This is the main continuation of the brachial. It passes across the inner aspect of the elbow-joint with the median nerve. It runs down the forearm on the posterior surface of the flexor perforans and between this muscle and the flexor metacarpi internus and divides into large and small metacarpal arteries at the middle third of the forearm —at a much higher level, therefore, than usual. It is visible throughout the forearm if the flexor metacarpi externus and flexor perforans be gently separated. The main division passes beneath the tendon of the flexor metacarpi internus and is thus

continued through the carpal sheath as the large metacarpal artery (Equus).

The smaller of the two divisions, which corresponds to the small metarcarpal artery (fig. iv, 11), passes downwards and almost immediately disappears from view. It is not, therefore, as superficially placed as in other animals, since it is covered at the knee by a layer of dense fascia, to which reference has already been made.

These vessels will be more fully described later in a deep dissection of the part, as also the digital arteries.

The Nerves.

Median (fig. iii, 2).—This is very large. It leaves the brachial plexus and runs down in front of the axillary artery and subsequently in front of the brachial. It passes with the latter vessel along the groove formed at first between the coraco-humeralis and small head of triceps extensor cubiti and then between the latter muscle and the biceps. Passing over the inner aspect of the elbow-joint with the posterior radial artery it accompanies this vessel down the forearm. It does not thus come into relationship with the back of the radius, but is embedded between the deep flexor of digits and the flexor metacarpi internus.

It then runs through the carpal sheath and down the metacarpal region in the fibrous tube surrounding the flexor tendons, as the internal plantar nerve.

Immediately on leaving the plexus it gives off a branch which joins the root of the ulnar nerve. It is interesting to compare this communication with the ulnar with the contribution from the median which passes to the ulnar just above the knee in Equus to assist in forming the external plantar nerve. In the loop formed between this branch and the root of the ulnar nerve the axillary rests. In some other species, including Equus, this loop is formed between the two roots of the median.

In addition to the musculo-cutaneous branch and the nerve to the biceps and coraco-humeralis there is another branch detached in the arm which passes to the biceps (fig. iii, 4, 7 and 23).

Ulnar (fig. iii, 10).—This nerve is formed by a root from the brachial plexus with a contribution from the median nerve. It passes down behind the axillary and brachial arteries, crossing

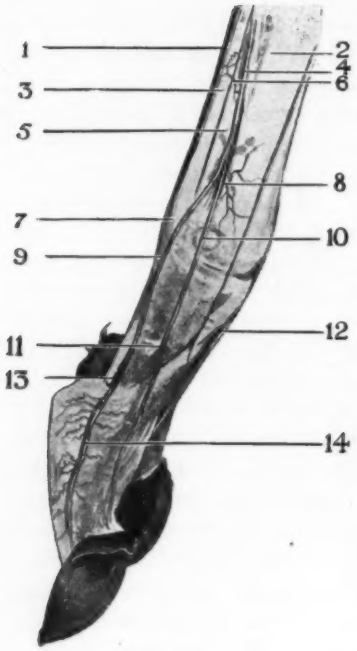

FIG. VII.

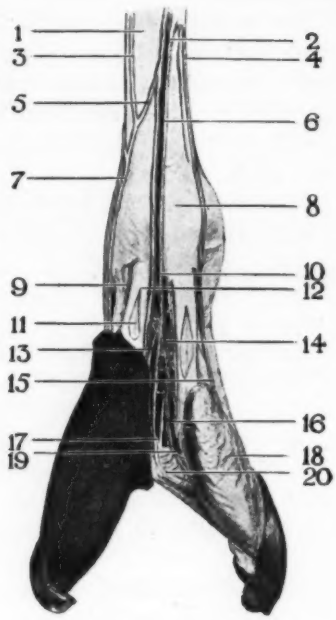

FIG. VIII.

LEFT LIMB—INTERNAL DIGIT—INNER ASPECT.

1, Large metacarpal artery lying on back of flexor tendons; 2, large metacarpal bone; 3, tendon of superficial flexor of digits (flexor perforatus); 4, internal collateral nerve of internal digit; 5, tendon of deep flexor of digits (flexor perforans); 6, superficial branches of large metacarpal artery distributed to flexor tendons and their sheaths; 7, fibrous tube at back of metacarpo-phalangeal joint; 8, superficial branches of common digital artery; 9 and 10, anterior and posterior divisions of "4"; 11, branch of internal division of common digital artery corresponding to perpendicular artery of pastern; 12, tendon of anterior extensor of digits (extensor pedis); 13, internal collateral artery of external digit; 14, internal collateral artery of internal digit.

FOOT OF LEFT FORE LIMB. POSTERIOR ASPECT.

1, Tendon of superficial flexor of digits (flexor perforatus); 2, large metacarpal artery; 3, external plantar nerve; 4, internal collateral nerve of internal digit; 5, branch of communication between internal and external plantar nerves; 6, division of internal plantar nerve (main); 7, external collateral nerve of external digit; 8, dense fibrous sheath at metacarpo-phalangeal joint; 9, artery to external plantar cushion; 10, common digital or interdigital artery; 11, outer division of tendon of flexor perforans; 12, outer division of tendon of flexor perforatus; 13, internal collateral digital artery of external digit; 14, external collateral artery of internal digit; 15, continuation of "4"; 16, continuation of "14" in interdigital space; 17, internal collateral nerve of external digit; 18, superficial branches of internal collateral artery of internal digit; 19, external collateral nerve of internal digit; 20, interdigital plexus of arteries.

the deep humeral branch of the latter. It then inclines downwards and backwards on the surface of the small head of the triceps extensor cubiti muscle to the inner side of the olecranon process of the ulna.

In the forearm it splits into two portions, which were described on the outer aspect.

Circumflex (fig. iii, 9).—This is relatively a large nerve. It passes from the plexus outwards through a triangular space at the back of the shoulder below the long branch of the subscapular artery.

Musculo-spiral or Radial (fig. iii, 8 and 11).—This is an enormous nerve. It is relatively larger even than in Equus. It passes from the plexus downwards behind the circumflex nerve and then crosses the long branch of the digits as in Capra.

Suprascapular (fig. iii, 12).—This is a long slender nerve which takes the usual course.

Subscapular (fig. iii, 16).—This is in two slender filaments, which leave the brachial plexus and pass direct to the subscapularis muscle.

Deep Dissection of Knee (Inner Aspect).—Several interesting points were observed during the course of this dissection, many of which are illustrated in fig. vi. In this figure, 13 and 10 denote the incised edges of the two layers of the fibrous carpal arch, which was described when dealing with the fascia.

Upon hooking forward the edge of the superficial layer (13) the channel in which ran the vessel corresponding to the small metacarpal artery (fig. vi, 14) was fully displayed and the vessel was brought into view throughout the whole of its length (7 and 14). After being detached from the posterior radial (fig. vi, 1) it ran for a short distance on the surface of the deep flexor muscle of the digits (fig. vi, 3), giving off a small branch, which passed forwards and outwards between this muscle and the radius. It then crosses the tendon of the flexor metacarpi internus (fig. vi, 9), but immediately before crossing the tendon it detaches an articular branch which disappears in the interior of the joint. The position where this branch is detached is represented in fig. vi by a thickening of the parent vessel which is crossed by the line indicating the tendon (9).

A collateral branch is now given off which passes forwards, pierces the fibrous annular band and appears superficially on the

antero-internal aspect of the knee (fig. vi, 11), where it splits into two terminal branches which are distributed to the skin.

An incision through the deeper layer of the fibrous carpal arch revealed the interior of the carpal sheath when the lips of the incision were hooked apart.

The tendon of the flexor metacarpi internus muscle (fig. vi, 9) is observed to run obliquely downwards and forwards across the edge of the accessory division of the flexor perforans and then pass to its insertion by running beneath the small metacarpal artery.

In the sheath the large metacarpal artery (fig. vi, 8) lies alongside the tendon of the deep flexor of the digits and below the carpus emerges from the sheath on the inner edge of the tendon.

The Digits.

The Arteries.—The large metacarpal artery or collateral artery of the cannon, at the middle third of the metacarpal region leaves the inner aspect of the limb and passes obliquely downwards and backwards across the edge of the tendon of the flexor perforatus. It then descends the back of the limb in the middle line and arrives at the interdigital space.

Immediately below the metacarpo-phalangeal articulation it splits into two divisions. The inner of these passes downwards along the outer edge of the inner division of the flexor perforans tendon. Near the upper extremity of the first phalanx it detaches a small branch which passes beneath the flexor tendons transversely and appears on the inner aspect of the limb (fig. vii, 11). This branch corresponds to the perpendicular artery of the pastern. It also gives off a slender branch, which ascends in a retrograde manner along the edge of the tendon of the superficial flexor and which was traced to the metacarpo-phalangeal joint.

Just above the distal epiphysis of the first phalanx this inner division of the large metacarpal (or rather its continuation, the common digital) artery bifurcates.

The inner portion passes beneath the flexor tendons and appears on the inner aspect of the internal digit, of which it forms the internal collateral artery (fig. vii, 14). This vessel runs in a wavy manner along the whole length of the remainder of the digit. It gives off a number of branches which pass forwards

and are distributed on the anterior aspect, and a still greater number which pass backwards and are distributed to the fibro-fatty pad or cushion on the sole. These branches are represented in fig. vii. This division may be said to correspond to the preplantar artery of Equus.

The outer division forms the external collateral artery of the internal digit. It detaches anterior branches distributed to the digit. Its posterior branches present a most interesting arrangement, for they pass towards the middle line in the "webbing" between the digits, where they form a series of anastomoses with the corresponding vessels from the opposite digit (fig. viii, 20). A number of arterial arches are thus formed, and these give off a large number of small vessels which form a plexus between the digits. The whole of the terminal portion of the digit is thus surrounded by a network of small vessels and its blood supply is most profuse.

The Nerves.

Ulnar Nerve.—The superficial division of the ulnar nerve (fig. ii, 7) passes downwards over the outer aspect of the knee and runs down the anterior aspect of the metacarpal region. At the bifurcation of the digits this division splits into two portions, and each of these runs along the dorsal aspect of one of the digits to its termination and constitutes its dorsal nerve.

Internal Plantar Nerve.—This large nerve, which is the direct continuation of the median, runs along the inner edge of the tendon of the flexor perforans. At the middle third of the metacarpus it gives off a large branch which passes downwards alongside the large metacarpal artery and inclines with it towards the back of the limb. It then leaves the vessel and, passing outwards, ultimately joins the external plantar nerve, which it provides with a considerable reinforcement.

Just across the metacarpo-phalangeal joint the internal plantar nerve gives off a long and slender branch, which is distributed to the inner aspect of the internal digit, whilst the main portion of the nerve follows the course taken by the internal collateral artery.

The external collateral nerve of the internal digit and the internal collateral nerve of the external digit are formed by the bifurcation of a branch of the internal plantar nerve which leaves

the latter just below the point of detachment of the branch of communication to the external plantar nerve. This branch passes down the limb to the inner side of the common digital artery to the interdigital space, where it forms the two collateral digital nerves as stated.

The External Plantar Nerve.—This is much smaller than the interior plantar. It is the direct continuation of the deep division of the ulnar nerve. From the division of the latter it runs through the carpal sheath and thence down the limb on the outer edge of the tendon of the flexor perforans.

At the metacarpo-phalangeal articulation it receives the above-mentioned branch of communication from the internal plantar nerve, and is then continued down the outer aspect of the external digit, to which it is distributed, and of which it forms the external collateral nerve.

General Remarks.—Unlike most other members of the Ungulata, the large nerves and vessels were found to be on soft structures throughout their course. In this connection the extraordinary development of the small head of the triceps extensor cubiti and the flexor perforans are particularly striking, since they afford a soft bed for the median nerve and the brachial and posterior radial arteries in those situations where in most other animals these structures are in direct relationship to the bones themselves (*e.g.*, Equus and Capra).

Another notable feature is the protection of the muscles and tendons by the very dense deep fascia, a remark which especially applies to the fibrous tube described for the passage of the tendon of the superficial and deep flexor muscles of the digits in the metacarpal region.

Although, as is well known, this animal is used in some countries as a beast of burden, it is somewhat surprising that its use has not become more general. In animals so used the parts which are most subject to wear and tear and are the most liable to injury are the limbs. Thus horses are frequently rendered unfit for work from paralysis of one or other of the big nerves of the limbs (*e.g.*, suprascapular, musculo-spiral, &c.), or injury to the flexor tendons in the metacarpal region.

It has been pointed out above how unusually well protected and supported these structures are in the llama.

LOCAL ANÆSTHESIA.*

By Veterinary-Councillor **VAETH.**

Heidelberg.

I. History.

The endeavour to allay pain is as old as mankind itself. In fact, we find a few statements about analgesic methods among the old civilized nations of Asia and Europe. Thus the ancient Greeks, and after them the Romans, used pain-allaying substances such as the poppy, Indian hemp, henbane, mandrake root, and mandragora; and in the Middle Ages the same ideas prevailed. Cataplasms of the above-mentioned substances were placed on the field of operation, or so-called sleep sponges soaked in the juices of such narcotizing plants were applied. Also to us older veterinary surgeons the use of soothing baths and poultices is not foreign, although in the present student's day these are only ordered in painful bone and foot diseases. But they have all only incompletely fulfilled their avowed object and have gradually passed into oblivion, and with the discovery and perfection of general narcosis they have been more and more discarded. But, however the latter may be valued, it still has certain resultant disadvantages and dangers.

Time and again means and methods have been sought to enable local anæsthesia to be carried out. To the first and oldest belongs compression of the nerve on its bony foundation, whereby an interruption of the nerve conductivity can be produced, such as we experience, for example, when our limbs go to sleep. Neuralgic pains may be allayed by beating and pressure on the nerves. Also extreme cold is capable of making the nerve endings as well as the trunks non-excitable. This circumstance was taken advantage of by the doctors in the campaigns of Napoleon I. On this principle rest also the methods of James Arnott (1849) by means of application of salt and ice solutions to make a region of skin painless, the cold produced by the evaporation of ether of Richet (1858) and the ether spray of Richardson (1866). Cold anæsthesia, however, is actually only limited to the skin, and hence inadequate. Another, but also incomplete, method consists in rendering a part bloodless by ligaturing a blood vessel, since suitably used along with cocaine. Finally,

* From *Deutsch. tierarzt. Woch.*

also the electric current (the so-called Le Duc's current) has been employed for this object.

These methods were used until Koller (1884) made his communication on cocaine anæsthesia in the eye. It teaches the possibility of an elective influence of the sensible nerve apparatus by chemical substances, and on this possibility to narcotize the sensitive nerves transiently and without injury by certain drugs local anæsthesia depends. Since cocaine is the point of origin for all preparations which are used to-day to dull pain, and since through it all major studies on local anæsthesia have been made, so it shall serve as the basis of our discussion.

Cocaine is obtained from the leaves of the coca plant growing in South America, where its partly exciting and partly calmative effects have long been known. The leaves were brought to Germany by Scherzer, and Niemann and Lossen produced cocaine from them in Wöhler's laboratory in 1860. Twenty years elapsed before the knowledge of its pain-quelling properties penetrated so far with the medical fraternity that they resolved to use it. About the year 1884 one heard of its success in eye operations, and about the same time the first notices appeared on the subcutaneous employment of cocaine in surgical operations in Germany, Austria, and America. In the last-named countries it was chiefly Corning who proved the increased effect of cocaine in tissues devoid of blood, and hence the possibility to produce effect by injection of highly diluted solutions (0.25 to 0.5 per cent.); thus also the possibility of interrupting the conductivity in sensitive nerves by cocaine injections.

After him it was the Frenchman Reclus, who at the end of the 80th year used cocaine largely as a pain alleviator, until at the commencement of '90 the Berlin surgeon Schleich made known the infiltration anæsthesia named after him. It consists in influencing the sensible nerve endings of the field of operation itself by anæsthetizing solutions.

Next to this terminal anæsthesia Braun's method had great significance, and was known as regionary or conduction anæsthesia. It is really only the practical outcome of Corning's work, and consists of the fact that by injection of anæsthetics in the neighbourhood of conducting nerve trunks an interruption of conductivity of this nerve trunk is produced whereby the peculiar field of operation remains intact. A further method, a

subdivision of conduction anæsthesia, is the circular anæsthesia of Hackenbruch, whereby the whole field of operation is encircled by injecting anæsthetizing solutions, and thus the conductivity to the same is completely interrupted. Braun has also used *suprarenal preparations* as an addition to the anæsthetic, and thereby reduced the danger of poisoning. A further advance is to be expected from Bier's venous anæsthesia, in which, at the arm or leg, between two tourniquets, a ½ per cent. novocaine solution is injected into a vein. In this way an anæsthesia complete enough to perform major operations, such as resections and amputations, peripherally from the tourniquets, without causing any pain, may be produced. Also here chemistry has succeeded in producing a compensating preparation for the poisonous cocaine, and as a result *novocain*, in spite of its rather powerful effect but relative non-toxic character, has come much into vogue, so that now cocaine, except for analgesing the mucous membrane and the eye, is almost wholly discarded. In quite recent years the chemist has produced *suprarenin* synthetically.

II. Local Anæsthesia, its Effect and Dosage.

To explain principles we will again take cocaine and treat of it as an example. Cocaine is a white, colourless, odourless powder of bitter taste, which is easily soluble in water and alcohol. Its peculiar effect depends on a pure chemical process, on its affinity for the protoplasm of the tissues, and above all for that of sensitive nerves, whereby the susceptibility to pain as touch and pressure sensation is very considerably diminished. The motor nerves are so little influenced that the cocaine solution scarcely comes into consideration as a rule with them at all. There is an elective effect on sensitive nerves which originates a varied reaction in single kinds of nerve fibres. Also the reflexes of the nerves of the mucosa remain unaffected, as, for example, those of the conjunctiva. This is of great significance for operations on the larynx, nose, &c.

The central nervous system on the contrary shows a very great susceptibility. A considerable quantity of cocaine gaining access to the general circulation produces its effect primarily on the brain and spinal cord, secondly on the heart; on the other hand, one notices nothing of an increase of irritability of the

peripheral sensitive apparatus. This can also only be produced by local application (maximal dose for man 0·05 grm. per dose; 0·15 per diem).

Besides the nervous elements in the tissues the vessels are influenced by the local cocaine effect. They contract, and the blood contents of poisoned tissues are thus considerably diminished. This has two advantages: firstly, cavities covered with mucous membrane are easily accessible, and secondly, the anæmia supports the effect, whilst it retards the resorption of the cocaine from the tissues, and it arrests it longer at the place of its application.

The great significance of the different blood contents of the tissue for the carrying out of cocaine anæsthesia shows itself, for example, in that anæsthesia of the eye in inflammatory hyperæmia is much more difficult to carry out than where this condition is absent.

Schleich has practically, and Morel experimentally, proved that a quantity of cocaine injected in concentrated solution produces severe symptoms of poisoning, whereas a dilute solution is well borne. One can inject double the maximal dose in 0·1 per cent. solution without danger, whilst a small fraction of a 5 per cent. solution produces the severest toxic symptoms and may lead to death.

In cocaine poisoning the patient immediately after injection is attacked with giddiness and syncope, the skin becomes blanched, the pupil dilated and fixed, the pulse small and quick. Thumping heart-beats and increased blood-pressure occur, the temperature of the body rises. At first one notices clonic spasms, then paralysis and lack of sensation, the reflexes vanish, and finally coma and death occur. (Observations on the dog.)

In slight cases the invalid recovers after a few seconds; in severe cases marked symptoms or irritability set in, having an intoxication-like character. Death often occurs quickly and unexpectedly from paralysis of the respiratory centre.

In order to avoid poisoning we must—

(1) Employ solutions as dilute as possible that will nevertheless produce complete anæsthesia.

(2) Seek to retard the resorption of the cocaine into the circulation.

In reference to the first point experience teaches that 1 to 2

per cent. solutions are well borne in veterinary practice, and in union with the hereafter-mentioned drugs retardation of absorption is accomplished. A maximal dose in horses, cattle, and dogs has never been announced in literature to my knowledge. Vebele says: "Symptoms of poisoning in horses and cattle occur after doses of 0·0007 per kilogramme (0·3 *in toto*); in dogs after 0·0175 per kilogramme (0.1 *in toto*), and upwards. For the rest many animals are more susceptible than others. So long as the introduction of cocaine into the blood and its poison-spreading effect are held in check great quantities of cocaine may be employed without danger to the organism. As a rule, however, as Fröhner asserts, quite small doses suffice. Thus one employs 3 to 5 per cent. solutions to produce analgesia on mucous membranes, and for subcutaneous application, as we shall see later on, 0·5 to 1 per cent. solutions suffice."

Great difficulty stands in the way of its employment on serous tissues which have great powers of resorption. In joints and the bladder one injects quite dilute solutions (0·1 to 0·2 per cent.). In quite young animals and children, as well as in anæmic and cachectic subjects, cocaine should be excluded. With reference to the second point, the retardation of the resorption of the anæsthetic, the following is valuable:—

Braun, as already stated, has conjoined suprarenin preparations with cocaine solutions in order to avoid resorption, and consequently to do away with any danger of cocaine poisoning. We will therefore discuss this preparation and its effect.

To-day the synthetically produced white-looking suprarenin (adrenalin) is almost solely used either in solution of 1:1000, or as an addition to tablets. It is worthy of note that this solution should show no rose colour, because such a solution is not only non-effective, but by decomposition has become poisonous. On this account one uses that prepared by the manufacturer in small bottles and protects it from the light.

The effect of suprarenin (adrenalin, suprarenin, &c., always produce an irritability of the sympatheticus; they attack only those nerve endings which belong to the sympathetic system) consists, according to experimental researches, of a contraction of the muscularis of the heart as well as also of the smooth muscle of the whole body, especially of the median and small vessels. Thereupon a narrowing of the vessels at the place of injection

occurs, and then anæmia, together with a retardation of local circulation—consequently a local limiting of resorption of the anæsthetic, and so not only a decline of danger from poisoning, but also an increased local effect and a longer continuance of anæsthesia.

Suprarenal preparations have no analgesic effect, but as a result of their strong vessel contracting peculiarities the field of operation may be rendered bloodless and visible. On this account we must never forget that these preparations injected in great quantity are very poisonous and may cause death under symptoms of lung œdema, convulsions, and paralysis. They should, therefore, only be used in small quantities and dilute solutions added drop by drop. In the novocain tablets of Merck, and the sterile solutions of Bengen, this addition has already been made. In general, according to Schlesinger, 1 to 4 drops in 10 c.c. of solution for infiltration and circular anæsthesia, 1 to 2 drops to 1 c.c. for interruption of conductivity of great nerve trunks, may be employed.

If contrary to expectation cocaine poisoning does occur—I myself have experienced it—the body is put in the horizontal position with the head lower; also cold water is sprinkled on the head. In severe cases caffeine or camphor is subcutaneously administered, strong friction is applied to the skin, and eventually artificial respiration is carried out.

In order to avoid poisoning as much as possible, cocaine has for some time been made up with other preparations. Of all new drugs novocain has proved the best, so that cocaine, except for analgesing mucous membranes and the eyes, is hardly ever used.

Novocain is a white crystalline powder that may be heated to 120° F. without decomposing, and is quite soluble in water and alcohol. It causes no irritability and tissue injury, and its toxic effect is seven times less than that of cocaine, but its effect is also somewhat weaker, and bears a relation of 1 : 2 to that of cocaine. We can therefore use it in double the doses of cocaine. But since the anæmianizing effect of cocaine is absent, we must add suprarenin to it if we desire this effect. By so doing we increase its analgesic effect considerably.

Besides, it is sterilizable like all synthetic supplementary preparations.

III. The Methods of Local Anæsthesia and their Employment.

Apart from anæsthesia of the skin by cold by means of ethyl chloride, which is suitable for slight affections and operations in the skin, three chief methods are recognized:—

(1) Superficial anæsthesia.

(2) Infiltration anæsthesia according to Schleich.

(3) Conduction anæsthesia.

Recently Bier has produced anæsthesia by injection of novocain into the veins between two tourniquets (the area being previously deprived of blood by compression bandages), so-called venous anæsthesia, but to my knowledge this method has not been used in veterinary practice, but nevertheless it might be useful in small animals.

(1) *Superficial Anæsthesia.*—Towards the end of 1880 we first obtained knowledge of cocaine and its anæsthetizing effect on the conjunctiva was especially proclaimed. In this region, and to do away with pain in the external mucosa as well as in cavities, it has held its position up to the present in spite of the concurrence of other methods.

Terminal anæsthesia in the conjunctival sac does not extend beyond the mucosa, and may be attained with small doses. A 2 per cent. solution without suprarenin is generally used. Two to three instillations of 5 to 10 drops are necessary. Lack of sensibility occurs quickly as a rule, say in two to three minutes. In cattle analgesia is not produced with cocaine, and the matter of an effective analgesia in this animal is a suitable object of research for a candidate for a doctor's degree. For mucous membranes we still use strong concentrations (10 to 20 per cent. cocaine solution), painting with a camel hair brush or application of soaked tampons and the like. However, with the size of the resorption surface the danger of poisoning increases. In hyperæmic or ulcerous surfaces the danger is the greatest.

To make serous cavities, joints, or hydrocele sacs painless one first infiltrates 0·5 per cent. novocain solution and suprarenin at the point of injection, and eventually injects this solution into the joint to the full, after evacuation of the fluid in the cavity.

After the lapse of ten minutes one can not only inject medica-

ments, but also correct contractions if they are only of a reflectory nature and there are no deformities.

(2) *Infiltration Anæsthesia according to Schleich.*—By this we understand an infiltration of the region of operation with certain solutions according to Schleich, by which under pressure the tissues are much œdematized artifically. First the skin to the extent of the incision and the subcutaneous cellular tissue immediately beneath it are infiltrated, then gradually the deeper layers, layer by layer, and indeed with great quantities of the fluid. Three solutions have been chiefly used recently.

Solution 1.	*Solution* 2.	*Solution* 3.
0·1 cocaine	0·05 cocaine	0·01 cocaine
0·1 alypin	0·05 alypin	0·01 alypin
0·1 sod. chlor.	0·2 sod. chlor.	0·2 sod. chlor.
100·0 distilled water	100·00 distilled water	100·00 aqua dest.

Schleich lays stress on 0·2 per cent. salt solution (recently 0·8 salt solution has been used, since it causes no tissue injury), which he considers to be an anæsthetic. Besides, by the artificial œdema anæmia is produced, and by pressure compression of the nerve endings. According to him the cocaine acts in the latter way, whilst others consider the last constituent is the effective agent in his solutions. Infiltration anæsthesia is not practicable in inflamed tissues, since it produces intense pain in this condition. In such cases we turn to the third method.

(3) *Conduction Anæsthesia.*—Discovered by Corning, was practised by Braun and Hackenbruch, and to-day plays the first *rôle*. By it one understands a method in which a certain field of operation is made painless by anæsthetization of nerve trunks leading to the brain and spinal marrow and by interruption of the sensible conductivity. This happens when we inject the means in the neighbourhood of nerves, the injection reaching them by diffusion. By the injection the nerve conductivity is interrupted, and thus the extent of the region anæsthetized.

Here we must note the histological fact that the nerve sheaths of the five nerve branches are thin, and towards the centrum add proportionately to the strength and thickness of the nerve trunks. With strong protective coverings the difficulty of anæsthetization and the concentration of solutions increases. Therefore where it is possible we seek to make a field of operation painless by anæsthetizing the smaller nerve trunks.

For this object the circular anæsthetization of Hackenbruch is suitable. In this case the tissue round about the field of operation is infiltrated with solutions so that the conductivity of the nerve trunks supplying all the field of operation is interrupted. To accomplish this we use large quantities of fluid. In order to avoid poisoning we also take 1 per cent. novocain solutions and use, according to size of animal, 50 to 100 c.c. in horses, and 10 to 25 c.c. in dogs.

Where circular anæsthesia is not sufficient we must seek out especially the strong nerve trunks and interrupt their conductivity by strong solutions and copious addition of suprarenin. Formerly it was considered important to inject over the course of the nerve, but I have noted that an injection in its neighbourhood will accomplish the same object. Two per cent. novocain solutions with suprarenin usually suffices.

Conduction anæsthesia, according to Schleich, has the advantage that after the onset of painlessness the operation need not again be interrupted, greater painlessness results, and the unchanged tissues enable a better recognition to be made between healthy and diseased structures.

Finally, we may call attention to Vdriski's method of diagnosing lameness by conduction anæsthesia and the so-called spinal marrow anæsthesia produced by injection of cocaine solutions into the lumbar sac. I will only here call attention to their danger and by-effects.

(4) *Venous Anæsthesia.*—For four years Bier has practised this method. It consists of injection of anæsthetizing solutions under pressure, between two blood-expelling bandages, into the veins of an extremity; within a very short time complete painlessness is produced.

We have already stated that our literature contains no experiences of this method, but I myself am convinced that it might be used on the hind limbs of dogs.

(To be continued.)

Clinical Articles.

NOTES ON AN OUTBREAK OF HORSE SICKNESS, CONNECTED WITH THE PRESENCE OF A LYPEROSIA AS A POSSIBLE TRANSMITTER.

By Captain A. J. WILLIAMS, F.R.C.V.S.
Army Veterinary Corps, Secunderabad, India.

In the *Journal of Tropical Veterinary Science*, vol. iii, No. 1, of 1912, there is an interesting article on "Biting Flies and Surra," by Mr. A. S. Lees, M.R.C.V.S., Veterinary Officer Investigating Camel Diseases in India.

Having met with an outbreak of horse sickness, apparently transmitted by a species of lyperosia, under conditions very similar to those mentioned by Mr. Lees in connection with the transmission of surra by the same fly, these few notes may be of interest.

In November, 1908, I was S.V.O. with the Nyima Expedition in the Gebel Sub-Province of Kordofan. The troops returning to Khartoum arrived at the base, Dilling, on November 21, among them being half a squadron of Egyptian cavalry, mounted on Arab horses. The horses were very fit, and there had not been a death since they marched out from Dilling at the beginning of November.

On the morning of November 22 one of the local police horses was reported very ill, and was found to be dying from horse sickness, acute pulmonary form. This animal had not been with the force.

The following day a mule belonging to the Survey Department died at 12 p.m. Condition same as above case. This animal had been in Dilling three weeks. Both these cases were typical horse sickness, acute pulmonary form.

November 28.—The first case among the cavalry horses appeared this morning. The animal was treated for very severe tympanitic colic on November 6 at a camp about five miles from Dilling, and as the force was moving camp on the 10th the animal was sent to the base, being unfit to march.

This turned out to be a typical case of the blue-tongue form. Twenty-four hours after the first symptoms appeared the animal was in a dying condition, and was destroyed.

The primary symptoms were as follows: Refusal of food, subnormal temperature, lips swollen, mouth congested, salivation; later the swelling extended over the head, like a case of purpura hæmorrhagica, tongue enlarged and purple, whole oral cavity a purple colour, eyelids much swollen, and hæmorrhage from the conjunctiva.

November 29.—Another cavalry horse taken suddenly ill at 11 a.m. Non-painful swelling near side of face, swelling over the eyes and along the jugular furrow, tongue purple, ropy salivation, quids hay. Temperature 103·2° F. At 2 p.m. temperature 105° F.; 4 p.m. temperature 104° F., swelling increased, conjunctival mucous membranes scarlet colour. At 6 a.m. the following morning the animal was in a dying condition and was destroyed.

November 30.—It was decided to move the remainder of the horses, together with some locally purchased ones, to El Obeid, a distance of about ninety miles, and they marched out in the afternoon. An Egyptian veterinary officer at El Obeid took over veterinary charge.

Fifth Case at Dilling.—An officer's charger was isolated well away from all other animals on November 23, showing symptoms of strangles. On December 1 a large strangles abscess was opened, and the animal was doing well.

On December 7 the animal was found to be very ill. Temperature 106·5 F., conjunctivæ injected, and petechial blotches present, Horse sickness suspected.

December 8.—7 a.m., temperature 101° F.; 5 p.m., 104·2° F. Pneumonic symptoms present, both lungs affected, respiration much accelerated and laboured.

December 9.—7 a.m., temperature 100·2° F., yellow discharge from both nostrils, grunting, respiration 40, heart sounds muffled, and very rapid beat, dulness on percussion over lower third of chest on both sides; animal very weak. 3 p.m., died.

December 14.—Report received from El Obeid, dated 9th inst., saying that five cases had occurred among the horses which marched from Dilling on the 30th ult., as follows: December 6: One case, died in six hours. December 8: One case, found ill in the morning, and died same day. December 9: Three cases, all died after a few hours' illness.

December 15.—The sixth case occurred at Dilling. My charger reported ill at 11 a.m. Temperature 105·4° F.; symptoms of blue-tongue form. Died 5 p.m. next day.

December 16.—Another case this morning. At 11.30 a.m. an officer's charger found ill. Temperature 105·4° F., dull, off feed, staring coat, blowing. This pony was kept under a straw shelter some distance from other animals.

December 17.—Animal very ill, slight amber coloured discharge from the left nostril, swelling in supra-orbital fossa, pulse very weak, temperature 102·6° F., abdominal pain. 9 p.m., constant abdominal pain, pulse almost imperceptible. 12 p.m., died.

December 18.—News from El Obeid saying there had been eight deaths from blue-tongue, and another animal not expected to live.

December 21.—Arrived at El Obeid. Found the last case was on the 12th inst. Horse No. 15, present condition as follows: Temperature 103° F., lungs in a bad state, legs much swollen, especially from the knees down, animal very dull and weak.

A fresh case occurred to-day at 12 a.m. Horse No. 101, temperature 106° F., dull, and quidding hay. 5 p.m.: Temperature 104° F., extensive bulging swellings over the eyes, eyes appeared pressed forward with great tension in the chambers, conjunctival mucous membrane scarlet, upper lid partly erected.

December 22.—No. 101. Stertor, hæmorrhage from conjunctival mucous membrane, pulse weak, pulmonary symptoms, animal in a very bad state, died following day.

December 24.—Horse No. 15 taken ill on the 12th inst., and seemed a hopeless case. Is now improving. Milk and eggs and stimulants given.

This animal made a good recovery, and after some time at El Obeid on tonics and special feeding was sent to Khartoum to rejoin the unit. This was the only case that recovered.

There were no cases among the horses purchased locally.

Remarks.—The course of the disease, symptoms, and *post-mortem* appearances were typical, identical with those described in an article on "South African Horse Sickness," by the late Captain J. F. Coley, in THE VETERINARY JOURNAL some time ago

There was little chance of treatment, as the disease ran a rapid course in most of the cases. Intravenous injection of pot. iod. was tried in the case which occurred on December 16, but it had no effect.

There are several points of interest in connection with this outbreak, more especially regarding the conditions under which the disease occurred, and the probable method of transmission.

The country around Dilling is sandy, desert-like, and during the dry season water is obtained from wells about 60 ft. deep. Horse sickness is well known to the Arabs in the surrounding country, appearing as usual with the first rains, and disappearing, as a rule, when the cold weather has set in. They call the disease "Nigma," because the horse sickness season coincides with the appearance of a certain star. They are so superstitious about it that they float some bright object on the water where they take their animals to drink, thereby hoping to prevent the disease by reflecting the light of the star, which they consider is connected with the evil results.

On inquiries being made, it was found that several cases had occurred among the Arab horses in the vicinity of Dilling in November and December, and they all said it was most unusual to get cases so late in the year.

The important point is that there were no mosquitoes and no biting flies to be found, except a lyperosia, which I think was the species known as "*Lyperosia minuta*, Bezzi," the same as mentioned by Mr. Lees. They were very numerous around the wells and in the horse lines. They attacked the horses in large numbers, and drew blood in pin-like points.

The cases occurred at intervals of from six to ten days, as follows:—

At Dilling		At El Obeid		
1st case on November 22		5th case on December 6		
2nd ,, ,, 23		7th ,, ,, 8		Disease contracted at Dilling and appeared after arrival at El Obeid
3rd ,, ,, 28		8th		
4th ,, ,, 29		9th ,, ,, 9		
6th ,, December 7		10th		
12th ,, ,, 15		11th ,, ,, 12		
13th ,, ,, 16		14th ,, ,, 21		

The horses arrived at El Obeid on December 3, and judging by the period of incubation in the other cases, it appears that in the 5th, 7th, 8th, 9th and 10th cases the disease was contracted at Dilling, but the 11th and 14th cases were infected at El Obeid.

As it was extremely probable that some horses were infected prior to their leaving Dilling, the following precautions were taken on their arrival at El Obeid:—

(1) The animals were picketed out a mile away from all other animals, with plenty of space between the lines.

(2) The water for them was carried from wells on camels.

(3) Smoke was kept going through the lines from smouldering fires on the windward side.

(4) The temperature of all the horses taken three times a day. Any animals showing a rise of temperature were immediately segregated half a mile away from the lines. They were constantly watched, and if any animal refused his feed or showed any signs of dulness the temperature was immediately taken.

It was not known that lyperosia existed at El Obeid, but as the conditions were similar to those at Dilling, and there was every chance of some cases occurring among the animals owing to infection previous to leaving Dilling, if lyperosia did exist the immediate segregation of any animal showing a rise of temperature, at a distance of half a mile from the lines, was thought to be the best precautionary measure, thus moving the centres of infection beyond transmitting range from the healthy animals.

Lyperosia were found at El Obeid in the vicinity of the lines, and this probably accounts for the two last cases which undoubtedly became infected there. The lines were on sandy desert country, and the only water was in deep wells over a mile away. There were no mosquitoes, or any biting fly except the lyperosia.

There appear to be good grounds to suspect this outbreak as one due to direct transmission by lyperosia, and the disease, as in several other recorded cases, occurred in a desert, waterless country, with symptoms identical with those seen in the South African horse sickness.

As far as I am aware there has not been any previous record of an outbreak of horse sickness in which the character of the outbreak pointed to direct transmission of the disease by lyperosia, in the absence of other biting flies or mosquitoes, and it will be interesting to know whether veterinary officers at present serving in the Sudan have met with the disease under similar conditions.

FIVE CASES OF MUSCULAR RHEUMATISM.

By Chief Veterinary-Surgeon ANGER.

In June of this year, of ten horses of heavy breed which had taken part in night exercise, five exhibited the following symptoms: Profuse patchy sweating, stiff gait, especially of the hind quarters. The steps were short and cautiously taken; two patients could scarcely move from the place; one patient at the commencement of movement could not lift up the off hind leg, but kept it markedly flexed; the muscles of the loins, croup and thigh felt hard and painful on pressure. Only in one patient were there inflammatory symptoms in the fore and hind feet. Temperature 38·9° C. to 39·4° C.; pulse from 42 to 50; respirations 20 to 28; appetite poor or absent. From these symptoms and with the history that the horses had stood overnight in high damp grass the diagnosis of muscular rheumatism was given. The horses were probably brought to the spot in a heated condition, rapidly cooled in the damp misty night, and stood for hours together in the damp grass, which in places reached up to the belly and chest wall. Forage was taken with the horses and consisted chiefly of oats with little hay, a circumstance which perhaps contributed to the illness, if one bears in mind the lack of movement and the long standing. It was noticeable that in the horses of the warm-blooded type of other portions of the troop which experienced the same unfavourable conditions no cases of illness occurred, whilst in the horses of cold-blooded race 50 per cent. were ill, a proof of the small capability of resistance and easy susceptibility of the cold bloods.

Treatment consisted in rest, friction, after previous rubbing with spirit of camphor and oil of turpentine, of each equal parts, warm clothing and diet. After six to ten days all the subjects recovered.—*Zeitschrift für Veterinärkunde.*

Canine Clinical.

SOMEWHAT UNUSUAL EFFECT OF MORPHIA IN TWO PUGS.

By S. J. MOTTON, M.R.C.V.S.
Penzance.

As a general anæsthetic in dogs, morphia has earned a well-deserved popularity. Apparently much larger than the doses ordinarily employed for producing general anæsthesia may be injected without fatal result.

Occasionally, however, it happens that symptoms, calculated to cause alarm when seen for the first time, may occur even when ordinary doses are employed.

I think the following two cases will support that suggestion.

Case 1.—A pug, male, aged 13, developed in the region of the anus an unsightly tumour. It was resolved to remove this, and, as an anæsthetic, twenty minims of *injectio morphinæ hypodermicæ* B.P. were injected subcutaneously. Vomition did not follow, but in about fifteen minutes the dog became hysterical, and yelped for nearly twelve hours continuously. During this period he became alarmingly tympanitic, and there were several liquid motions of the bowel, accompanied occasionally by the passage of flatus. He did not, of course, become sufficiently narcotized to allow of the removal of the tumour, which was excised at a later date, a local anæsthetic being used. There was a total loss of power in the hind limbs for six or seven hours. Thirteen hours elapsed before he could walk well, and before all traces of tympany had disappeared.

Case 2.—A pug, aged 2, required the removal of his eyeball. Twenty minims of *injectio morphinæ hypodermica* B.P. were again employed. Satisfactory anæsthesia did not ensue, and the dog was hysterical for eight or nine hours—yelping pitifully during the greater part of that time.

The unusual behaviour of these animals was not due to the quality of the injection, for afterwards some of the liquid from the same bottle was employed in other dogs, and the usual train of symptoms followed.

Abstracts and Reports.

VICTORIA VETERINARY BENEVOLENT FUND.

THE quarterly meeting of the Council of this Fund was held at 10, Red Lion Square, London, on Thursday, July 3, 1913. There were present: Messrs. Dunstan, Slocock, Sumner, Garnett, and Shipley.

The minutes of the previous meeting were read and confirmed.

On the proposition of Mr. S. Wharam, seconded by Mr. Abson, Mr. R. C. Trigger, J.P., was unanimously elected President for the ensuing year.

Messrs. Freeman Barrett, P. J. Simpson, E. A. West, and W. Burt were elected Vice-Presidents.

Proposed by Mr. Abson, and seconded by Mr. Garnett, Mr. Shipley was re-elected Secretary and Treasurer.

The Secretary then gave his quarterly report, arising out of which Mr. Garnett proposed, and Mr. Slocock seconded, that the donation from Mr. Simpson be left on deposit at present with a view to attempt to carry out his wishes.

The Secretary pointed out that a sum of £90 would be required to get a child into a charitable institution with a view to education.

Mr. Simpson gave a further cheque of £3 4s. 5d., donations received since the remittance of the last cheque.

On the proposal of Mr. Abson, seconded by Mr. Garnett, a hearty vote of thanks was given to Mr. Simpson for his gift, and the Secretary was instructed to write expressing the Council's gratitude.

Proposed by Mr. Sumner, and seconded by Mr. Burt, a sum of £2 be sent to the Secretary of the Home in Edinburgh towards the cost of the funeral expenses of Mrs. Johns, an old recipient.

The Council confirmed the action of the Finance Committee in making grants to Mrs. Shivas and Mrs. Walsh. A weekly grant of 5s. each was voted to Mrs. Shivas and Mrs. Walsh, on the proposition of Mr. Burt, and seconded by Mr. Wharam, the finances of the Fund being insufficient to make a larger allowance.

In presenting his report the Secretary said:—

I think, first of all, I should call to your notice the handsome donation of a cheque, value £70, received from Mr. P. J. Simpson, of Maidenhead, the result of his efforts in producing a play for the benefit of our Fund.

Financial Statement.—We have expended in the half-year to June 30, £179 7s. 4d. Our income has been £257 17s. 5d. We have, therefore, a balance of £81 2s. 1d. Outstanding subscriptions, £60 15s. Dividends, £48 3s. 9d.; making a total, if all outstanding subcriptions are paid, of £190 0s. 10d. to meet a liability of £174 for relief.

If any fresh cases occur this will leave practically no money to help and no money for incidental working expenses.

We have now thirty-two members of the Council. If I could only induce them to find two subscribers each to our Fund, how much better off we should be.

We also owe a great debt of gratitude to the Veterinary Press for the help they have given us, and I especially appreciate very much their kind remarks.

THE LATE MR. R. A. N. POWYS.

It is with very great regret that we announce the death of Mr. R. A. N. Powys, which occurred suddenly from heart disease on July 10.

For nearly forty years Mr. Powys held the position of Secretary to the London Veterinary College, and during that

THE LATE MR. R. A. NORMAN POWYS.
For Thirty-seven Years Secretary of the Royal Veterinary College, Camden Town.

time literally hundreds of students and their parents came before him, mostly during the awe-striking period of a first interview with their *Alma Mater;* and his bold, clear handwriting was generally the first which ever started them on their future careers

as veterinary practitioners. To the student he was always courteous, and to those who knew him intimately, his colleagues in daily life at the College, he was warm-hearted and a real good friend. That he should have reached his 70th year seems almost incredible, and his unvarying regularity in his work made him looked upon as a pillar of the College which could never be removed or done without. So rarely was he late at arriving or departing from the College precincts that the students almost set their watches by his presence; and by his death, practically in harness, the veterinary profession has lost one more of the landmarks of its career.

ROYAL COLLEGE OF VETERINARY SURGEONS.

At the meeting of the Board of Examiners, held in London on July 7 for the Written, and on subsequent dates for the Oral and Practical Examinations, the following gentlemen passed their respective Examinations:—

Royal Veterinary College, London.

Final Examination.

Mr. W. A. Austin
,, C. E. W. Bryan
,, J. Blackburn
,, R. T. Davis,
,, C. Davenport
,, H. W. Dawes*
,, G. van de W. de Kock
,, R. Daubney*
,, G. O. R. Grey
,, D. C. Greene
,, A. Hoskin
Mr. V. J. Hare
,, H. Hicks
,, W. Kendrick
,, A. V. Nicholas
,, A. A. Pryer
,, J. M. L. Penhale
,, J. Southall
,, W. L. Sheffield
,, A. R. Smythe
,, G. M. Vincent
,, J. A. Ward

Third Examination.

Mr. C. O. A. Anderton
,, R. M. Bamford
,, S. R. Beaumont*
,, H. H. Curson*
,, H. S. Cockburn
,, E. E. Jelbart
,, R. H. C. Lucas
,, A. G. E. Lalor
Mr. G. H. Melck*
,, W. B. Pershouse
,, R. J. Stow
,, R. H. Stalker
,, F. H. Stainton,
,, J. F. D. Tutt*
,, C. H. S. Townsend
,, W. H. Wortley*

Second Examination.

Mr. F. J. Andrews
,, T. J. Bosworth
,, F. Canilla
,, H. V. M. Métivier*
,, W. R. McKinna*
,, G. E. Oxspring*
,, R. H. Penhale*
Mr. H. C. Rockett
,, W. Shipley
,, P. R. Turner
,, T. L. Wright*
,, G. S. Walker
,, E. Wallace
,, J. H. M. White

Marked thus (*) passed with Second-class Honours.

First Examination.

Mr. G. Barnett*
,, S. C. J. Bennett*
,, J. C. Coleman
,, C. K. Calder
,, R. Catmur*
,, A. Carter*
,, I. R. R. Coleman
,, W. H. Dickinson*
,, H. J. Edwards
Mr. L. Hughes
,, C. W. Heane*
,, F. L. Haydon*
,, R. B. Nelder
,, L. E. Pritchard†
,, C. J. Peach*
,, S. R. Rippon*
,, G. C. Taylor
,, G. F. Watkins

ROYAL VETERINARY COLLEGE, EDINBURGH.

Final Examination.

Mr. J. Conner | Mr. R. S. Little

Third Examination.

Mr. N. Brear*
,, T. Dalling
,, J. W. Hayes
,, G. C. Lancaster
,, R. G. I. Lake
Mr. D. Marshall*
,, T. M. Mitchell
,, J. J. Plunkett
,, R. Simpson
,, B. van der Vijver

Second Examination.

Mr. W. H. Dennett
,, R. Dalling
,, J. Edgar*
,, W. Harley
Mr. W. Hay
,, C. K. Lomas*
,, B. Philp
,, R. K. Porteous

First Examination.

Mr. T. Bannatyne
,, A. Noel Metcalfe
,, N. Bisset
,, J. D. Coutts
,, J. S. Carewal
,, G. Howie*
,, J. Knox Irvine
Mr. J. Judge
,, E. H. Milner
,, E. C. Nelson
,, J. R. Rider*
,, A. Rouse
,, C. V. Watkins

ROYAL VETERINARY COLLEGE OF IRELAND.

Final Examination.

Mr. J. J. O'Neill
,, T. G. Browne
,, M. P. Hatch
,, J. J. Hegarty
,, J. P. McNally
Mr. J. J. Mills
,, J. J. Pomeroy
,, T. Kerry Reddin
,, C. M. Stewart
,, Ml. Twomey

Marked thus (†) passed with First-class Honours.
Marked thus (*) passed with Second-class Honours.

Third Examination.

Mr. J. Campbell
,, S. O'Donel
,, E. H. Wyly
,, W. A. Buchanan
,, W. G. Clarke
,, F. J. Daly
,, H. Dolan
,, C. P. Fisher
,, S. Flood
Mr. P. J. Hayes
,, H. Jewell
,, M. J. Killelea
,, R. J. Lowe
,, P. J. Mulcair
,, O. D. Neary
,, J. O'Carroll
,, W. P. Power
,, M. J. Ryan

Second Examination.

Mr. J. J. English
,, T. J. McDonald*
,, J. A. Brew*
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Marked thus (†) passed with First-class Honours.
Marked thus (*) passed with Second-class Honours.

Review.

A System of Veterinary Medicine. By various writers. Edited by E. Wallis Hoare, F.R.C.V.S. Vol. I, "Microbial Diseases." London: Messrs. Baillière, Tindall and Cox, pp. 1,328 + xvi. Royal 8vo. Price 21s. net.

In the May number of THE VETERINARY JOURNAL we gave what was necessarily a preliminary and brief notice of a new text-book on veterinary medicine, which has now removed from the English veterinary profession a reproach which has been present for years, and has brought it into line with Continental veterinary science; and for this, even if there was no other reason, Mr. Wallis Hoare deserves the thanks of his English colleagues. The labour bestowed upon such a work is colossal, and Mr. Hoare has done wisely in inviting the collaboration of specialists upon subjects other than those in which he himself can claim exceptional experience, for the range of animal diseases is so vast, and the knowledge upon the subject has increased so much during recent years, that for any one man to attempt to be a specialist upon them all would be an absurdity. Even the editorship of such a subject as that comprised under the title of "A System of Veterinary Medicine" gives work such as no one who has not attempted anything of the kind can ever dream of, and to have produced a book which brings the subject up to date, Mr. Hoare, who is a busy practitioner, must have sacrificed many years of leisure. It is the busy man who finds time to do other work, and the editor of this book is a proof of the adage. The book is intended for the daily practitioner, and the whole tone of the writing throughout marks it for this object—the collaborators selected being men who have had special experience in the disease or diseases upon which they write.

In the first volume the microbial diseases are classified and dealt with, and their list is a lengthy one, far too lengthy to deal with in detail in the space allotted for a review; and some idea of things may be obtained from the fact that their description runs into a total of some 1,328 pages. Suffice it to say that as a work of reference the book is one which every practitioner should possess—especially those who hold positions as inspectors under the Board of Agriculture or the various County Councils.

The printing and binding of the book is the best possible, and a tribute to the publishers. In fact, for everything, external appearance and internal knowledge, it is the best guinea's worth the profession has had put before it in the whole of its history.

Translation.

VERGOTININE IN THE TREATMENT OF BROKEN WIND (PULMONARY EMPHYSEMA).

By H. PERRIN.

Officer of the Legion of Honour; formerly Chief Veterinary Surgeon of the French Army.

In these days of strenuous competition it is extremely important that the utility of those animals which share man's labours should be uninterrupted by disease, or, if such a misfortune should occur, it is of the greatest importance that they should be cured as quickly and as completely as possible, so that they may be able to return to work without avoidable delay.

Among the diseases to which horses are subject the one known colloquially as "broken wind" occurs pretty frequently as a sequel to affections of the respiratory organs, especially after bronchitis, after bronchial catarrh in young animals, and after various other chest complaints in animals of all ages.

Broken wind supervenes when the bronchial tubes are clogged with catarrhal phlegm, the smaller bronchioles being stopped up, and the pulmonary vesicles being more or less filled with the products of inflammation or of muco-purulence; violent fits of coughing are caused and consequent dilatation of the vesicles is produced and they are frequently ruptured. It follows then that air escapes from the said vesicles and penetrates into the pulmonary lobes, where hæmatosis ensues and certain formations, like little pockets, are initiated; these end by compressing neighbouring vesicles. The resultant suppression of such vesicles limits the area of respiration, and breathlessness is the only effect of hastened breathing.

Pulmonary emphysema is also due to violent straining in drawing heavy loads; the lungs being filled to excess in order to enlarge the thoracic cavity and thus to afford increased power of resistance to the muscular traction that is demanded by a supreme effort. Dilatation sometimes results, and sometimes actual rupture of the vesicles ensues on account of the fixed rigidity of the thorax. The glottis of the antrum is also liable to occlusion, in which case the inspired air cannot be released through muscular action.

A similar effect can be produced by dust, especially when it is accompanied by heated air, as in summer. Obstructions are due to the action of dust on the mucous membranes or to the cough which is provoked.

It is well known how unbreathable air can become when it is loaded with the dust which is raised in such clouds by automobiles rushing along unprepared roads.

The flower dust of forage, especially of old lucerne, acts on the respiratory organs much in the same way as other dust. Sore

throats and infectious pneumonia sometimes follow feeding on powdery grasses.

Pulmonary emphysema was known formerly in France under the name of "*Haut Vent.*"

In such cases as have been described, the horse-doctors of old considered the lung itself to be contused or lacerated, as they believed, through the violence of coughing; later on various authors recognized that broken wind can more reasonably be attributed to dilatation and rupture of the pulmonary vesicles with atrophy of inter-alveolar cells.

This view was corroborated by assiduous *post-mortem* examinations. These autopsies of emphysema revealed in the substance of the lungs and on the surface under the pleura the existence of rounded prominences that were filled with air and that resembled minute pockets, of the size of a pea or larger. This condition made the surface of the lungs look like the skin of batrachians.

In its beginnings pulmonary emphysema can very easily escape notice, that is to say, while its ravages are circumscribed; but by degrees the affection is bound to involve a larger area and the symptoms must eventually attract attention.

The animal begins with a little dry cough, repeated from time to time, especially at night and in warm air. Then, little by little, this cough becomes more frequent. It is observed that the animal quickly gets out of breath when at work. The expiration begins to be interrupted, for there seems to be more or less difficulty in getting rid of air that has been drawn into the lungs; then soon the same difficulty is observed with regard to inspiration, and often grey mucus is seen adhering to the wings of the nostrils, which are always very much dilated after a run or even after very moderate work. At a further stage of the complaint, when respiratory interruptions are accompanied by starts, breathing becomes noisy. The animal ends by being completely broken-winded, it pants incessantly, and is unable to do any more real work at the risk of suffocation.

The prospects of the affection are so grave that the existence of emphysema in an animal renders the purchase of it null and void. In all times the best efforts have been directed to the cure or mitigation of this complaint, but very little success attended the employment of all the numerous remedies that used to be tried.

Of recent years, however, in consequence of a more thorough knowledge of the lesions that characterize the condition, and also thanks to the many new chemical discoveries that have been utilized, the treatment of emphysema has become much more hopeful. We ourselves, in common with numerous other veterinarians, have used with the very best results a combination of veratrine, strychnine and ergotinine made up with glycerine. This has been called Vergotinine. These alkaloids act both in a general and in a special manner. The special local action principally affects the structure of the pulmonary vesicles by restoring the contractibility which had been lost through undue distension. This

local action of vergotinine is even able to renew the elasticity of vesicles that have been compressed almost out of existence by their distended neighbours, or by the encroachments of inter-lobular air pockets. The latter are reduced by degrees until they disappear and all vesicles gradually recover their tone. Stretched and attenuated capillaries return to their normal condition, consequently the re-establishment of regular and renovating nutrition conduces to the regeneration of ruptured vesicles and of more or less atrophied inter-alveolar cells.

In proportion to the working of vergotinine after administration, the breathing appears to be rendered easier, its rhythm becoming regular. The cough is less frequent, less violent and less resonant, finally it ceases altogether.

Besides acting locally, vergotinine effects a great improvement in the general health through its power of correcting irregularities in the functions of nutrition and also through its stimulative action on the organs of respiration, through its power of regulating deep circulation, of alleviating cardiac and pulmonary troubles, and of increasing the activity of the nerve centres.

In fact, this valuable preparation is found to be a very active agent in health restoration; it quickly gives back full strength to any suffering equine on whom it is tried. Its employment is indicated in all chest complaints, since it is desirable that they should be cured as soon as possible and that the possibility of any subsequent emphysema should be averted.

The symptom of continual running at the nose, accompanied by cough, is a special warning of the necessity for recourse to this specific. Numerous trials have established the effectiveness of vergotinine in the treatment of pulmonary emphysema and of the chest complaints which are likely to bring it on.

The *Répertoire Vétérinaire* of November 1, 1911, published accounts of excellent results that had been obtained. Another important testimony to the same effect is given by Berraud, veterinary surgeon in charge of the horses of the Parisian Suburban Cab Company. He attributes to vergotinine the improvement and cure of many broken-winded horses; some among them had been sufferers of long standing.

Vergotinine is well known, not only in France, but in other countries where it is already much used and with equal success. In Italy the Professor of Pathology and Clinical Science at the Veterinary School of Turin recognizes the preparation as a valuable therapeutic resource, that, by regulating the rhythm of respiration, in a short time it renders possible the satisfactory resumption of work by horses which had been incapacitated by advancing emphysema. This had previously prevented them from moving, except at a foot's pace, and even then they were obliged to stop every moment for want of breath.

In Germany, the *Tierarztliche Wochenschrift* (veterinary weekly), of Berlin, of October 10, 1910, gave publicity to the experiences of Schade, who was extremely successful in his treatment of chronic diseases of the lungs by means of

Vergotinine. He particularly mentions the case of an Oldenburg stallion who was suffering from chronic emphysematous dyspnœa which had formerly been treated in various ways without improvement, but which was quickly cured by vergotinine.

To all these favourable reports we add our own. We are continually employing Vergotinine, not only in the treatment of pulmonary emphysema, but in all chest complaints. To our mind the preparation is the best means of overcoming the atrophic inertia of affected organs and of re-establishing their physiological nervous activity.

We would mention, as an additional merit in Vergotinine, the ease with which it can be administered. It is made up in the form of a mixture, the dose of which is a teaspoonful, to be sprinkled over the feed, small doses only being required. If the above-mentioned mode of administration could not be adopted, it would be necessary to inject the alkaloids every day with a Pravaz syringe, and many animals would not endure the frequent repetition of such a method of treatment; besides, it would be costly, whereas the method as advocated is most economical.

Letters and Communications, &c.

Captain Williams; Mr. Motton; Mr. Mitchell; Mr. Payne; Professor Liautard; Dr. A. Hughes; Mr. C. J. Dixson; Mr. W. M. Scott; Mr. G. Mayall; Captain Deacon; Mr. A. E. Willett; Mr. T. B. Goodall; Mr. J. F. D. Tutt; Captain Pallin; Mr. Mitter; Professor Sisson; Professor Craig; Dr. Burton Rogers; Professor Law; Mr. Bevan; Mr. Haskell.

Books and Periodicals, &c., Received.

The American Veterinary Review; Journal of the Royal Army Medical Corps; Recueil de Médecine Vétérinaire; L'Hygiène de la Viande et du Lait; Revue Générale de Médecine Veterinaire; Der Tierarzt; Zeitschrift für Veterinärkunde; Berliner tierärztliche Wochenschrift; Osterreichische Wochenschrift für Tierheilkunde; La Clinica Veterinaria; Revista de Medicina Veterinaria; Board of Agriculture and Fisheries; Department of Agriculture and Technical Instruction for Ireland; Kennel Gazette, Agricultural Journals for the Union of South Africa and for Rhodesia; American Journal of Veterinary Medicine.

NOTE.—All communications should be addressed to 8, Henrietta Street, Covent Garden, London, W.C. Telephone, 4646 Gerrard. Telegrams, "Baillière, London."

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